

Sigi Koko

1527 N. Stafford Street
Arlington, VA 22207
703-243-5030
sigikoko@earthlink.net
www.buildnaturally.com

Sigi Koko**Down to Earth****Abstract*****"One person's waste is another's treasure"***

This presentation's main focus is resource efficiency and sustainability. She concentrates on the importance of 5 goals: reducing, reusing, using renewable and durable, and recycling of products. This presentation also gives strategies to accomplish these goals and methods of evaluation.

Biography

Sigi Koko founded *Down to Earth* in 1998 to provide sustainable design and consulting services in the Mid-Atlantic Region. Prior to founding *Down to Earth*, Ms. Koko worked for Hellmuth, Obata + Kassabaum, where she created their *Healthy and Sustainable Building Materials Database* and provided expertise on a variety of design projects. She currently designs natural, healthy, and sustainable buildings, and specializes in passive solar design, energy and water conservation, healthy and sustainable building materials, "green" specifications, and construction waste recycling. She provides consulting services and educational seminars to architects, builders, and developers, and has provided guest lectures at area universities, including the University of Maryland School of Architecture.

Recent environmental consulting projects include: a city block redevelopment in lower Manhattan, Montgomery Park Office Business Center (a 1.3 million SF office building) in Baltimore, East Stroudsburg University Alumni Center, and firm-wide written specifications for Hellmuth, Obata + Kassabaum. She has additionally designed several strawbale structures in the greater Washington/Baltimore region. Publications by Ms. Koko include: Interior Graphic Standards Chapter on Green Building Materials, "*Five Steps to Keep Strawbale Walls Dry*" article in *The Last Straw* journal, *Sustainable Product Review Column* in Hellmuth, Obata + Kassabaum's *Sustainable Design* newsletter, and *Healthy and Sustainable Building Materials Database: A New Internet-Based Design Tool* given at *The 21st Century Outlook Conference* sponsored by the American Institute of Architects, the U.S. Green Building Council, and the U.S. Department of Energy.

"One person's waste is another's treasure"**Key Principles****Resource Efficient & Sustainable**

- Reduce: *lower total burden*
- Reuse: *increases lifespan*
- Renewable: *replenished by natural (eco)systems*
- Recycled: *waste becomes a resource*
- Durable: *longer lifespan*

Healthy

- Non-toxic: *to people or ecosystems*

Local

Strategies

1. Reduce Materials
2. Reduce Construction & Demolition Waste
3. Select Healthy & Sustainable Materials

Reduce Materials

- Reuse existing building
- Reduce size of building
- Eliminate materials
- Create flexible space and components
- Select durable materials
- Evaluate waste stream of occupied building to reduce and recycle waste

Reduce Construction Waste

- Optimize building dimensions
- Evaluate construction waste stream and assess which materials have local recycling potential
- Identify manufacturer "take back" programs
- Create a Waste Management Plan
- Include a "Construction Waste Recycling" Section in Architectural Specifications

Select Healthy & Sustainable Materials

Healthy Materials are those that:

- Do not threaten human health AND
- Do not negatively impact natural ecosystems

Sustainable Materials are defined as:

- Renewable or regenerative AND
- Acquired without ecological damage AND
- Used without exceeding natural replenishment

Evaluation Method

Life Cycle Analysis

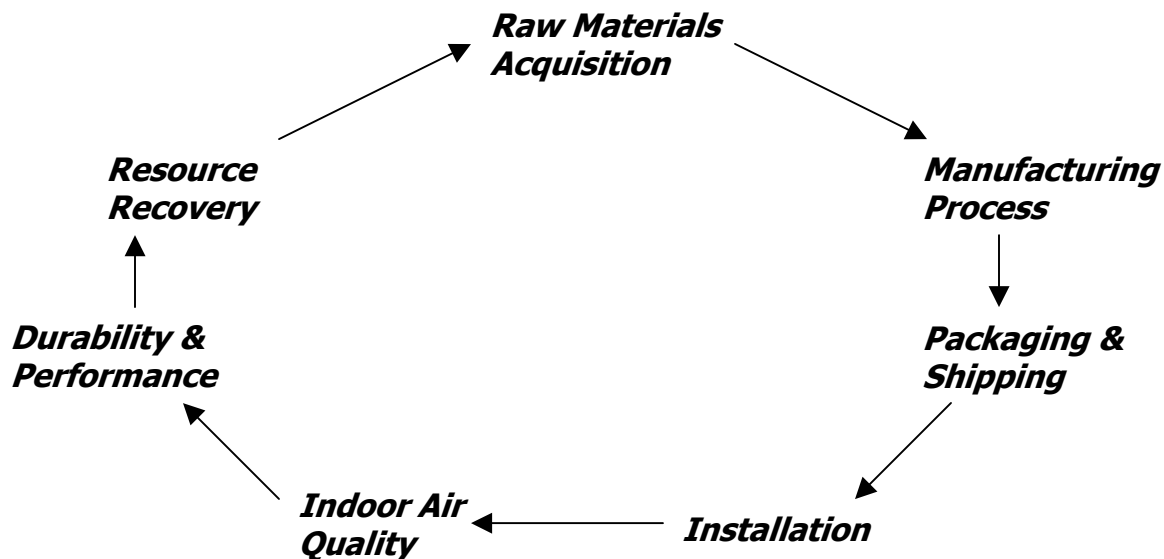
- "Cradle-to-Cradle"

- Qualitative Analysis
- Includes quantitative Embodied Energy calculations

Life Cycle Analysis: Overview

<u>Raw Material Acquisition</u>	Safe, low impact, rapidly renewable
<u>Manufacturing Process</u>	Safe, closed-loop systems, low energy
<u>Packaging</u>	Minimal waste
<u>Shipping</u>	Minimal transportation energy
<u>Installation</u>	Safe, simple, minimal waste
<u>Indoor Air Quality</u>	No negative health impacts
<u>Durability & Performance</u>	Appropriate, long-lasting, adaptable
<u>Resource Recovery</u>	Reusable, recyclable, biodegradable

Closed Loop Model



Baseline – Raw Materials Acquisition

- uses salvaged materials (minimal processing)
- uses rapidly renewable resources
- maximizes recycled content
- uses sustainable harvested woods
- uses non-toxic constituents
- avoids high embodied energy materials
- minimizes environmental impacts of acquisition (strip mining, dredging, clear cutting, etc.)

Waste Resources

Plastics

- Commonly recycled (up to 100%): PET, HDPE, LDPE

Metal

- Steel industry has high recycling rate (30-97%)
- Aluminum & copper are recyclable; difficult to find

Glass

- Mixed vs. color-separated

Paper Goods

- Newsprint has great value in building materials

Agricultural Waste

- Straw and Bagasse

Demolition/Deconstruction

- Potential source for high quality salvage materials

Manufacturing Waste

- "Post-Industrial" designation

Internet Resources

Alameda County www.stopwaste.org/materials/

California Integrated Waste Management Board Database

www.ciwmb.ca.gov/rcp/

Lawrence Berkeley National Laboratory Database

www.lbl.gov/ehs/wastemin/buying/

King County (Washington)

<http://dnr.metrokc.gov/market/map/matlist.htm>

Salvage Building Materials Listings by State

www.traditional-building.com/8dg.htm

Recycling the Past (NJ)

www.recyclingthepast.com/

Redi Guide

<http://oikos.com/products/>

EPA's Environmental Purchasing

www.epa.gov/oppt/epp/

Existing Assessment Tools

Environmental Resource Guide, *AIA COTE*

REDI Guide, *Iris Communications*

GreenSpec & EBN Newsletter, *Environmental Building News*

Environmental by Design

Kim LeClair & David Rousseau

Sustainable Design & Construction Database

National Parks Service

Choose Green Report

Green Seal

Sustainable Building Sourcebook

Natural Building Materials

- Rapidly renewable raw materials
- Non-toxic materials
- Use of low-tech and appropriate technology

Examples of Natural Building Materials

- Manufactured Products
- Rubble Trench
- Earthen Construction
 - Block – adobe, rammed earth
 - Monolithic – rammed earth, cob, cast earth
- Strawbale Construction

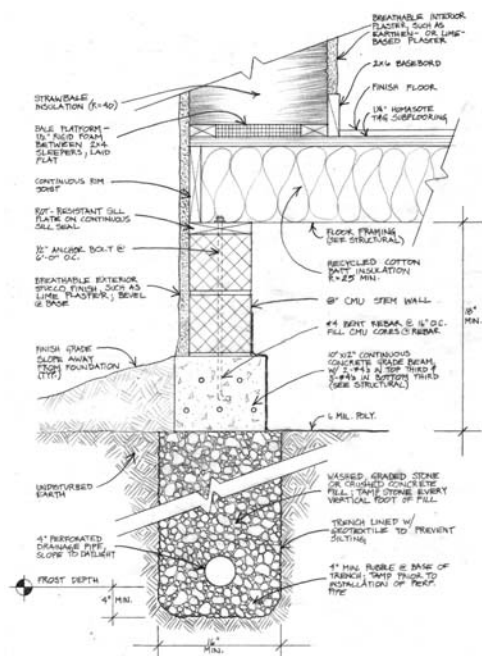
Manufactured Products

- Rapidly renewable
- Salvaged
- High post-consumer recycled content
- Non-toxic
- Limited Manufacturing Process
- Local

Rubble Trench Foundation

Rubble Trench

- Simple construction technique
- Use of low embodied energy materials
- Excellent freeze/thaw performance
- Inexpensive



Earthen Construction

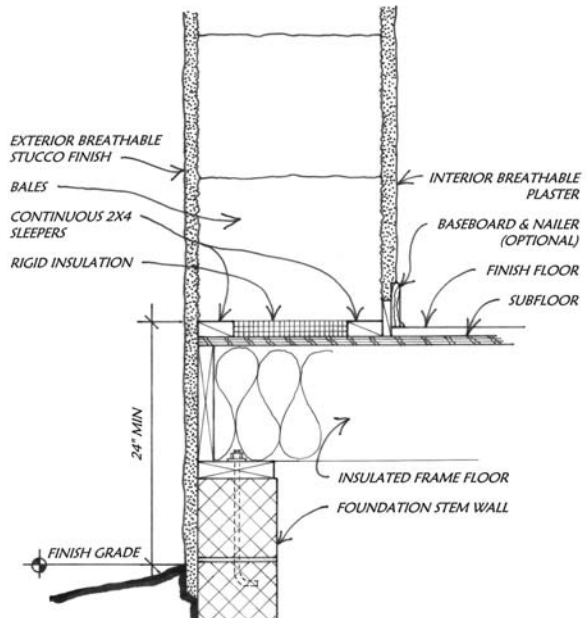
- Block – adobe, rammed earth blocks
- Monolithic – rammed earth, cob, cast earth
- Plasters

Strawbale – Benefits

- Super-insulating; high sound absorption
- Simple construction
- Standard structural system
- Inexpensive material
- Rapidly renewable and biodegradable
- Minimal energy to produce
- Thick-walls

Strawbale – Challenges

- Requires specific detailing
- Non-standard wall system
- Requires additional interaction with permitting officials
- Labor intensive



Community Involvement

Inexpensive Materials
Simple Construction Techniques
Labor Intensive



=

Opportunity for Community
"Barn-Raising"